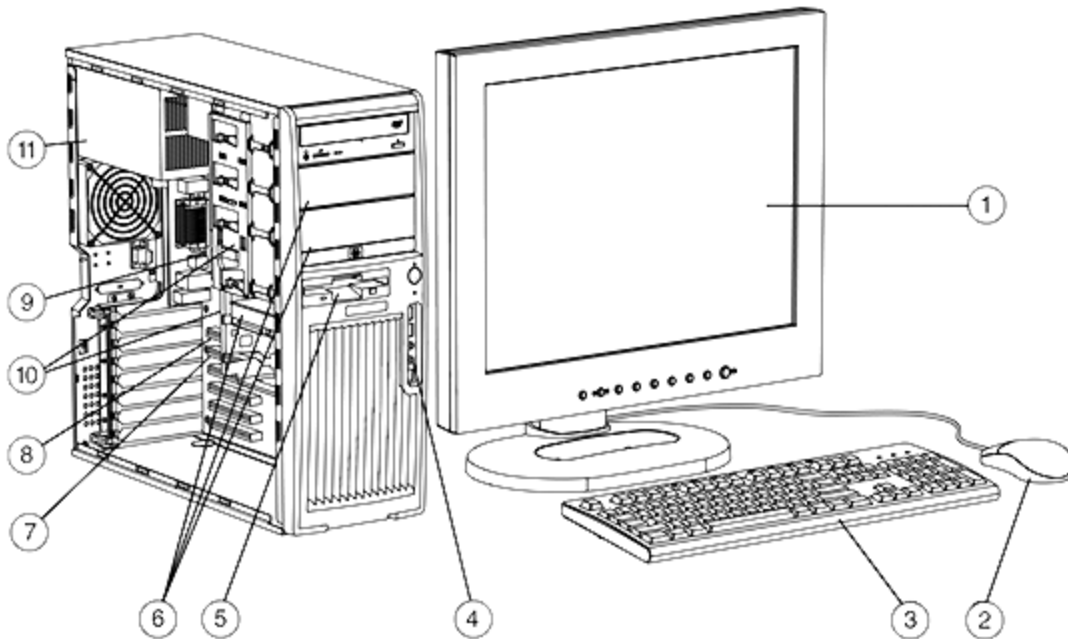


Overview



1. Monitor (sold separately)
2. 2-Button Scroll Mouse
3. 2004 Standard Keyboard
4. Front IO: 2 USB 2.0, IEEE-1394 (requires optional PCI card to enable), headphone and microphone
5. One 3.5" external bay for optional diskette drive or other 3.5" device
6. Three 5.25" external bays (3rd external is not full depth), and two 3.5" internal bays
7. 4 PCI slots, 2 PCI Express x1 slots
8. 1 PCI Express x16 Graphics slot
9. Rear IO: 6 USB 2.0, 1 standard serial port, 1 optional serial port, 1 parallel port, PS/2 keyboard, PS/2 mouse, RJ-45, audio in, audio out, mic in
10. Intel® Pentium® processor, some with EM64T extensions
11. 400 watt (peak) power supply

At A Glance

- Operating Systems:
 - Microsoft® Windows® XP Professional,
 - Red Hat Enterprise WS 3,
 - HP Installer Kit for Linux (see <http://www.hp.com/workstations/software/linux/> for details)
- Intel® Pentium® processor with Hyper-Threading Technology
- Support for future Intel® Extended Memory 64 Technology (EM64T) processors
- Intel 925X Express chipset
- Integrated HP Gbit LAN by Broadcom
- 800 MHz processor front side bus
- Convertible and tool-less minitower chassis
- 3 PCI-Express slots/4 PCI slots
- Dual channel DDR-2 memory at 533 MHz
- Four channel SATA Controller with RAID 0 or 1
- SoundMax Digital AC97 integrated audio with internal speaker
- Pre-loaded Manageability tools
- Protected by HP Services, including a 3-3-3 standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

Standard Features - Preconfigured Global Models

xw4200X/PD3.20/
B80/G512/XdF/s

Processor	Intel Pentium 4 at 3.20GHz
OS	Windows XP Professional
Cache Memory	1 MB L2
Memory	512MB (2x256) DDR2-533 ECC
Optical Drive	16X DVD-ROM
Hard Drive	80 GB SATA/150 7200 rpm (1st)
Graphics	Not included in base configuration - Please Choose a graphics card option below: ATI Entry 2D PCI Express (64 MB) NVIDIA Quadro NVS 280 PCI (64 MB, VGA & DVI) NVIDIA Quadro NVS 280 PCI Express (64 MB, VGA & DVI) NVIDIA Quadro FX 330 PCI Express (64 MB) ATI FireGL V3100 PCI Express (128 MB) NVIDIA Quadro FX 1300 PCI Express (128 MB) ATI FireGL V5100 PCI Express (128 MB) - available September 2004 NOTE: Please see Part Numbers in After market options/Standalone accessories section.
Mouse	HP scroll mouse (PS/2)
Other	Includes Floppy Drive and Standard PS/2 Keyboard

xw4200X/PD3.20/B80/G512/XdF/s Country Code Key

N. America	PD749AW#ABA	Switzerland (German/French)	PD749AW#AR8
Fr. Canadian	PD749AW#ABC	Switzerland (Italian/English)	PD749AW#ACN
L. America	PD749AW#ABM	Dutch	PD749AW#ABH
Japan (English)	PD749AW#ACF	Denmark	PD749AW#ACE
Japan (Japanese)	PD749AW#ABJ	Asia/Pacific (English)	PD749AW#AB4
UK	PD749AW#ABU	Korea	PD749AW#AB1
Germany	PD749AW#ABD	China	PD749AW#AB2
France	PD749AW#ABF	Taiwan	PD749AW#AB0
Italy	PD749AW#ABZ	India	PD749AW#ACJ
Spain	PD749AW#ABE	Australia	PD749AW#ABG
Europe	PD749AW#AK6	Thailand	PD749AW#AKL

Standard Features - Preconfigured Global Models

xw4200X/PD3.40/ B160/G512/XvF/s	Processor	Intel Pentium 4 at 3.40GHz
	OS	Windows XP Professional
	Cache Memory	1 MB L2
	Memory	512MB (2x256) DDR2-533 ECC
	Optical Drive	48X DVD-ROM/CDRW Combo
	Hard Drive	160 GB SATA/150 7200 rpm (1st)
	Graphics	Not included in base configuration - Please Choose a graphics card option below: ATI Entry 2D PCI Express (64 MB) NVIDIA Quadro NVS 280 PCI (64 MB, VGA & DVI) NVIDIA Quadro NVS 280 PCI Express (64 MB, VGA & DVI) NVIDIA Quadro FX 330 PCI Express (64 MB) ATI FireGL V3100 PCI Express (128 MB) NVIDIA Quadro FX 1300 PCI Express (128 MB) ATI FireGL V5100 PCI Express (128 MB) - available September 2004 NOTE: Please see Part Numbers in After market options/Standalone accessories section.
	Mouse	HP scroll mouse (PS/2)
	Other	Includes Floppy Drive and Standard PS/2 Keyboard

xw4200X/PD3.40/B160/G512/XvF/s Country Code Key

N. America	PD750AW#ABA	Switzerland (German/French)	PD750AW#AR8
Fr. Canadian	PD750AW#ABC	Switzerland (Italian/English)	PD750AW#ACN
L. America	PD750AW#ABM	Dutch	PD750AW#ABH
Japan (English)	PD750AW#ACF	Denmark	PD750AW#ACE
Japan (Japanese)	PD750AW#ABJ	Asia/Pacific (English)	PD750AW#AB4
UK	PD750AW#ABU	Korea	PD750AW#AB1
Germany	PD750AW#ABD	China	PD750AW#AB2
France	PD750AW#ABF	Taiwan	PD750AW#AB0
Italy	PD750AW#ABZ	India	PD750AW#ACJ
Spain	PD750AW#ABE	Australia	PD750AW#ABG
Europe	PD750AW#AK6	Thailand	PD750AW#AKL

Standard Features - Preconfigured Global Models

xw4200X/PD3.40/ C74/G1.0/XdF/s	Processor	Intel Pentium 4 at 3.40GHz
	OS	Windows XP Professional
	Cache Memory	1 MB L2
	Memory	1 GB (2x512) DDR2-533 ECC
	Optical Drive	16X DVD-ROM
	Hard Drive	74 GB SATA/150 10,000 rpm (1st)
	Graphics	Not included in base configuration - Please Choose a graphics card option below: ATI Entry 2D PCI Express (64 MB) NVIDIA Quadro NVS 280 PCI (64 MB, VGA & DVI) NVIDIA Quadro NVS 280 PCI Express (64 MB, VGA & DVI) NVIDIA Quadro FX 330 PCI Express (64 MB) ATI FireGL V3100 PCI Express (128 MB) NVIDIA Quadro FX 1300 PCI Express (128 MB) ATI FireGL V5100 PCI Express (128 MB) - available September 2004 NOTE: Please see Part Numbers in After market options/Standalone accessories section.
	Mouse	HP scroll mouse (PS/2)
	Other	Includes Floppy Drive and Standard PS/2 Keyboard

xw4200X/PD3.40/C74/G1.0/XdF/s Country Code Key

N. America	PD751AW#ABA	Switzerland (German/French)	PD751AW#AR8
Fr. Canadian	PD751AW#ABC	Switzerland (Italian/English)	PD751AW#ACN
L. America	PD751AW#ABM	Dutch	PD751AW#ABH
Japan (English)	PD751AW#ACF	Denmark	PD751AW#ACE
Japan (Japanese)	PD751AW#ABJ	Asia/Pacific (English)	PD751AW#AB4
UK	PD751AW#ABU	Korea	PD751AW#AB1
Germany	PD751AW#ABD	China	PD751AW#AB2
France	PD751AW#ABF	Taiwan	PD751AW#AB0
Italy	PD751AW#ABZ	India	PD751AW#ACJ
Spain	PD751AW#ABE	Australia	PD751AW#ABG
Europe	PD751AW#AK6	Thailand	PD751AW#AKL

Standard Features - Preconfigured Global Models

xw4200X/PD3.60/
B160/G1.0/XvF/s

Processor	Intel Pentium 4 at 3.60GHz
OS	Windows XP Professional
Cache Memory	1 MB L2
Memory	1 GB (2x512) DDR2-533 ECC
Optical Drive	48X DVD-ROM/CDRW Combo
Hard Drive	160 GB SATA/150 7,200 rpm (1st)
Graphics	Not included in base configuration - Please Choose a graphics card option below: ATI Entry 2D PCI Express (64 MB) NVIDIA Quadro NVS 280 PCI (64 MB, VGA & DVI) NVIDIA Quadro NVS 280 PCI Express (64 MB, VGA & DVI) NVIDIA Quadro FX 330 PCI Express (64 MB) ATI FireGL V3100 PCI Express (128 MB) NVIDIA Quadro FX 1300 PCI Express (128 MB) ATI FireGL V5100 PCI Express (128 MB) - available September 2004 NOTE: Please see Part Numbers in After market options/Standalone accessories section.
Mouse	HP scroll mouse (PS/2)
Other	Includes Floppy Drive and Standard PS/2 Keyboard

xw4200X/PD3.60/B160/G1.0/XvF/s Country Code Key

N. America	PD752AW#ABA	Switzerland (German/French)	PD752AW#AR8
Fr. Canadian	PD752AW#ABC	Switzerland (Italian/English)	PD752AW#ACN
L. America	PD752AW#ABM	Dutch	PD752AW#ABH
Japan (English)	PD752AW#ACF	Denmark	PD752AW#ACE
Japan (Japanese)	PD752AW#ABJ	Asia/Pacific (English)	PD752AW#AB4
UK	PD752AW#ABU	Korea	PD752AW#AB1
Germany	PD752AW#ABD	China	PD752AW#AB2
France	PD752AW#ABF	Taiwan	PD752AW#AB0
Italy	PD752AW#ABZ	India	PD752AW#ACJ
Spain	PD752AW#ABE	Australia	PD752AW#ABG
Europe	PD752AW#AK6	Thailand	PD752AW#AKL

Standard Features - Custom Components

Processor and Speed –

One of the following

All processors feature Hyper-Threading Technology

Intel® Pentium 4 Processor 2.80 GHz, 1 MB/800 MHz FSB

Intel® Pentium 4 Processor 3.00 GHz, 1 MB/800 MHz FSB

Intel® Pentium 4 Processor 3.20 GHz, 1 MB/800 MHz FSB

Intel® Pentium 4 Processor 3.40 GHz, 1 MB/800 MHz FSB with EM64T

Intel® Pentium 4 Processor 3.60 GHz, 1 MB/800 MHz FSB with EM64T

Intel® Pentium 4 Processor 3.80 GHz, 1 MB/800 MHz FSB with EM64T

This workstation will support Pentium 4 processors with Extended Memory 64-bit Technology as they become available from Intel

Operating System –

One of the following

Microsoft Windows XP Professional

Red Hat Enterprise Linux Workstation 3 Update 2 (32-bit available as pre-load, 32 & 64-bit available as an After Market Option)

HP Installer CD for Red Hat Linux 7.2, 7.3 and WS 3 Box Set (32bit and 64 bit)

See <http://www.hp.com/workstations/software/linux/>

Click on "Hardware support matrix" under "Related links" for details.

1st Hard Disk Drive –

One of the following

40 GB 7200 rpm Serial ATA drive

80 GB 7200 rpm Serial ATA drive

160 GB 7200 rpm Serial ATA drive

250 GB 7200 rpm Serial ATA drive

400 GB 7200 rpm Serial ATA drive (available Fall 2004)

36 GB 10K rpm Serial ATA drive

74 GB 10K rpm Serial ATA drive

73 GB 10K Ultra320 SCSI drive

300 GB 10K Ultra320 SCSI drive (available Fall 2004)

36 GB 15K Ultra320 SCSI drive

73 GB 15K Ultra320 SCSI drive

146 GB 15K Ultra320 SCSI drive (available Fall 2004)

2nd Hard Disk Drive –

One of the following

2nd hard drive, 40 GB 7200 rpm Serial ATA drive

2nd hard drive, 80 GB 7200 rpm Serial ATA drive

2nd hard drive, 160 GB 7200 rpm Serial ATA drive

2nd hard drive, 250 GB 7200 rpm Serial ATA drive

2nd hard drive, 400 GB 7200 rpm Serial ATA drive (available Fall 2004)

2nd hard drive, 36 GB 10K rpm Serial ATA drive

2nd hard drive, 74 GB 10K rpm Serial ATA drive

2nd hard drive, 73 GB 10K Ultra320 SCSI drive

2nd hard drive, 300 GB 10K Ultra320 SCSI drive (available Fall 2004)

2nd hard drive, 36 GB 15K Ultra320 SCSI drive

2nd hard drive, 73 GB 15K Ultra320 SCSI drive

2nd hard drive, 146 GB 15K Ultra320 SCSI drive (available Fall 2004)

Drive controllers

Integrated4 channel Serial ATA controller with RAID 0, 1 functionality

Optional SCSI controllers (required with SCSI HDDs)

Standard Features - Custom Components

Memory – One of the following	256 MB DDR-2 PC2-4300 (533 MHz) ECC (1 x 256 MB) 512 MB DDR-2 PC2-4300 (533 MHz) ECC (2 x 256 MB) 1 GB DDR-2 PC2-4300 (533 MHz) ECC (2 x 512 MB) 1.5 GB DDR-2 PC2-4300 (533 MHz) ECC (2 x 256 MB, 2 x 512 MB) 2 GB DDR-2 PC2-4300 (533 MHz) ECC (2 x 1 GB) 2 GB DDR-2 PC2-4300 (533 MHz) ECC (4 x 512 MB) 3 GB DDR-2 PC2-4300 (533 MHz) ECC (2 x 512 MB, 2 x 1 GB) 4 GB DDR-2 PC2-4300 (533 MHz) ECC (4 x 1GB) 128 MB DDR-2 PC2-3200 (400 MHz) non-ECC (1 x 128 MB) 256 MB DDR-2 PC2-3200 (400 MHz) non-ECC (2 x 128 MB) 512 MB DDR-2 PC2-3200 (400 MHz) non-ECC (2 x 256 MB) 1 GB DDR-2 PC2-3200 (400 MHz) non-ECC (4 x 256 MB)
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Removable Storage	1.44-MB Diskette Drive 48X CD-ROM Drive 48X/32X/48X CD-RW Drive 16X/40X DVD-ROM with +R Read 48X/32X/48X/16X Combo CD-RW/DVD-ROM Drive 8X 4.7GB DVD+R/RW Drive
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2nd Removable Storage	48X/32X/48X CD-RW Drive 16X/40X DVD-ROM with +R Read 48X/32X/48X/16X Combo CD-RW/DVD-ROM Drive 8X 4.7GB DVD+R/RW Drive
------------------------------	---

Keyboard – One of the following	PS/2 Standard Keyboard USB Standard Keyboard
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Mouse – One of the following	PS/2 2-Button Scroll Mouse PS/2 3-Button Mouse USB 2-Button Optical Scroll Mouse USB 3-Button Optical Mouse
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Audio	Integrated Digital AC97 audio with internal speaker Sound Blaster Audigy 2 ZS PCI sound card
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NIC	Broadcom 5782 10/100/1000 (PCI)
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Standard Features - Custom Components

Graphics

ATI Entry 2D PCI Express (64 MB)
NVIDIA Quadro NVS 280 PCI (64 MB, VGA & DVI)
NVIDIA Quadro NVS 280 PCI Express (64 MB, VGA & DVI)
NVIDIA Quadro FX 330 PCI Express (64 MB)
ATI FireGL V3100 PCI Express (128 MB)
NVIDIA Quadro FX 1300 PCI Express (128 MB)
ATI FireGL V5100 PCI Express (128 MB)

Miscellaneous

Solenoid lock and hood sensor
IEEE 1394 PCI Card
Configure minitower in desktop orientation
Energy Star Settings

Software

Symantec Norton AntiVirus 2004 (optional)*
HP Performance Tuning Framework*
Altiris Recovery*
HP Client Manager Software v6.0*
[* Not available with Linux Operating System.](#)

Standard Features - Specs

Form factor	Minitower	
Color	Carbonite/Alloy metallic	
Convertibility	Yes. 5.25" drives rotate for Minitower or Desktop orientation.	
System Board Form Factor	ATX (9.6" x 12")	
Processor	Single Intel Pentium 4 processors and Hyper-Threading Technology (EM64T technology will be supported as processors become available from Intel)	
CPU Bus Speed Supported	800 MHz FSB	
Standard L2 Cache	1 MB L2 cache	
Chipset	Intel 925X Express North bridge/ICH6R South bridge	
Memory Expansion Slots	4 DIMM's	
Memory Type Supported	DDR-2 (ECC and non-ECC)	
Memory Speed Supported	DDR-2 SDRAM PC2-4300 (533 MHz) ECC DDR-2 SDRAM PC2-3200 (400 MHz) non-ECC	
Maximum Memory	4 GB (4 DIMM slots)	
Network controller	Integrated Broadcom 5751 10/100/1000 for HP (PCI Express interface)	
Audio	Integrated AC'97 digital audio with S/PDif 6-channel pass-through, stereo microphone, and Yamaha XG Lite Softsynth support	
PCI slots	4 PCI slots (full-height, full-length) 2 PCI Express (x1) slots 1 PCI Express x16 graphics slot	
AGP slot	None	
Bays	Total Bays = 6	
Internal Bays	<ul style="list-style-type: none"> ● Two 3.5 inch SATA Hard Drive 	
External Bays	<ul style="list-style-type: none"> ● Two 5.25 inch bays ● One 3.5 inch bay for optional floppy drive 	
Parallel Port	1	
Serial Port	1 standard, 2nd is optional	
Front I/O	2 USB 2.0, IEEE-1394 (requires optional PCI card to function), headphone and microphone	
Rear I/O	6 USB 2.0, 1 standard serial port, 1 optional serial port, parallel port, PS/2 keyboard, PS/2 mouse, RJ-45, audio in, audio out, mic in	
USB Keyboard	Optional	
USB Mouse	Optional	
PS/2 Keyboard	1	
PS/2 Mouse	1	
Chassis Dimensions (H x W x D)	17.7 x 6.6 x 17.9 in (45.0 x 16.8 x 45.6 cm) 6.6 x 17.7 x 17.9 in (16.8 x 45.0 x 45.6 cm)	
Weight	Typical configuration – 35 lb	
Shipping weight	Typical configuration – 44 lb	
Temperature	Operating	40° to 95° F (5° to 35° C)
	Non-operating	-40° to 140° F (-40° to 60° C)
Humidity	Operating	8% to 85%
	Non-operating	8% to 90%
Maximum Altitude (nonpressurized)	Operating	10,000 ft (3,000 m)
	Non-operating	30,000 ft (9,100 m)
Power Supply	400 watts peak (360 W continuous) Auto-ranging within 230V (115v/230V line switch)	
Interfaces Supported	1 SATA interface (4 Serial-ATA connectors), 1 EIDE interface for optical drives, optional multi-bay interface	
Hard Drive Controller (PCI) Supported	Optional Ultra320 or Ultra320 RAID	

Standard Features - Specs

Operating System – one of the following
Microsoft Windows XP Professional
Red Hat Enterprise Linux Workstation 3 32-bit version. Update 2 in 32- and 64-bit available in Summer 2004 as aftermarket option.
HP Installer Kit for Linux (includes drivers for both 32-bit & 64-bit OS versions)
Preinstalled Software
Microsoft Windows XP Professional*
HP Client Manager Software v6.0*
Altiris Local Recovery*
Alert Standard Format specification*
Norton AntiVirus 2004 (optional preinstall)*
OR Red Hat Enterprise Linux Workstation 3 Update 2 (32-bit only)
OR HP Installer Kit for Linux (includes drivers for both 32-bit & 64-bit OS versions on xw8200, xw6200, xw4200)
CD/DVD software dependent on optical drive choices
* Not available on Linux

After-Market Options

Graphics	Multi display solutions	PCI	PCI-Express	
	NVIDIA Quadro NVS 280 (64 MB, VGA & DVI)	X		AA932A
	NVIDIA Quadro NVS 280 (64 MB, VGA & DVI)		X	DY650A
	DMS-59 to Dual DVI Cable for NVS cards	X	X	DL139A
	NVIDIA Quadro FX 330 (64 MB)		X	PB332A
	ATI FireGL V3100 (128 MB)		X	PE949A
	NVIDIA Quadro FX 1300 (128 MB)		X	PB331A
	ATI FireGL V5100 PCI-E (128 MB)		X	PB330A

Hard Drives	SATA Hard Drives			
	40 GB SATA/150 Hard Drive (7200 rpm)			PB371A
	80 GB SATA/150 Hard Drive (7200 rpm)			DE705A
	160 GB SATA/150 Hard Drive (7200 rpm)			DE706A
	250 GB SATA/150 Hard Drive (7200 rpm)			DS702A
	36 GB SATA/150 Hard Drive (10,000 rpm)			DU962A
	74 GB SATA/150 Hard Drive (10,000 rpm)			DX760A
	SATA power cable kit (2 per kit)			DN733A
	SCSI Hard Drives			
	36 GB Ultra320 SCSI Hard Drive (10,000 rpm)			AA612A
	73 GB Ultra320 SCSI Hard Drive (10,000 rpm)			AA613A
	146 GB Ultra320 SCSI Hard Drive (10,000 rpm)			AA614A
	300 GB Ultra320 SCSI Hard Drive (10,000 rpm) – available Fall 2004			DY672A
	36 GB Ultra320 SCSI Hard Drive (15,000 rpm)			AA616A
	73 GB Ultra320 SCSI Hard Drive (15,000 rpm)			AA617A
	146 GB Ultra320 SCSI Hard Drive (15,000 rpm) – available Fall 2004			DY671A
	Bracket HDD 3.5" to 5.25"			DY659A
	Cable, 3 port SCSI xw4200/6200			DY661A

Controllers	SCSI Controllers	PCI	PCI-Express	
	Ultra320 LSI 20320AR	X		DZ554A
	Ultra320 SCSI RAID Adaptec 2120S (Windows only)	X		AA850A

Removable storage devices				
	256 MB USB 2.0 Drive Key II (Available Fall 2004)			PH657A
	1.44 MB Internal Floppy Drive			DY670A
	HP DAT24i Internal DDS3 tape drive			C1555D
	HP DAT24e External DDS3 tape drive			C1556D
	HP DAT40i Internal DDS4 tape drive			C5686B
	HP DAT40e External DDS4 tape drive			C5687C
	HP DAT72i Internal DAT72 tape drive			Q1522A
	HP DAT72e External DAT72 tape drive			Q1523A

After-Market Options

Input/Output Devices	Keyboards		
	HP PS/2 Standard Keyboard		DT527A
	HP USB Standard Keyboard		DT528A
	Pointing Devices		
	HP PS/2 2-Button Scroll Mouse		DD440B
	HP USB 2-Button Optical Scroll Mouse		DC172B
	HP PS/2 3-Button Mouse		AA778A
	HP USB Optical 3-button mouse		DY651A
	USB Spaceball 5000		DV675A
	USB SpaceMouse		DZ203A

Networking	NICs	PCI	PCI-Express		
		Intel Pro/1000MT	X		DC193A
		HP Gigabit by Broadcom (BCM5782)	X		DC194A

Memory (DIMMs)	533 MHz DDR-2 PC2-4300 ECC Unbuffered DIMMs			
	256 MB DDR-2 PC2-4300 (533 MHz) ECC unbuffered			DY653A
	512 MB DDR-2 PC2-4300 (533 MHz) ECC unbuffered			DY654A
	1 GB DDR-2 PC2-4300 (533 MHz) ECC unbuffered			DY652A

Monitors	TFTs			
	HP TFT L2335 (23-inch)			P9615W#
	HP TFT L2035 (20.1-inch)			P9614W#
	HP TFT L1925 (19.1-inch)			P9626A
	CRTs			
HP P1230 (22-inch)			P9613A	

Multimedia	PCI	PCI-Express	
	1394 Firewire FH/LP PCI Card (Windows only)	X	

Optical Drives	DVD-ROM Drive			
	16X/40X DVD-ROM w/ +R read			AA620A
	CD-ROM Drive			
	48X Max CD-ROM Drive			DC143B
	CD-RW Drive			
	48X/32X/48X CD-RW Drive (Roxio software)			DE205A
	Combo Drive			
	48X/32X Combo DVD-ROM/CD-RW Drive (Roxio & WinDVD)			DE206A
	DVD+R/+RW Drive			
8X 4.7GB DVD+R/+RW Drive (Windows version)			DS703A	
8X 4.7GB DVD+R/+RW Drive (Linux version)			DT839A	

After-Market Options

Security	Chassis clamp lock, universal, no cable	DE817A
	Chassis clamp lock, universal, with cable	DE818A
	Rear Port controller cover	DE896A
Brackets/Stand	Depth Adjustable Rails (stationary)	332558-B21
	Sliding Shelf kit	234672-B21
	Fixed shelf kit	253449-B21
Other Devices	2nd serial port adapter	PA716A
	Front Card Guide and Fan Kit	DY648A
Operating Systems	Red Hat Enterprise Linux Workstation 3 Update 2 (32-bit version)	PD862A
	Red Hat Enterprise Linux Workstation 3 Update 2 (64-bit version)	PD863A
Software	HP Remote Graphics V2 LTU for HP WS	PE672A
	HP Remote Graphics V2 LTU for non-HP	PE673A
	HP Remote Graphics V2 Rcvr LTU	PE674A
	HP Remote Graphics V2 software media	PE675A
	Remote Workstation Sender SW Module	DM497A
	Remote Workstation Receiver SW Module	DM498A

Memory

Intel 925X Express chipset

DDR-2 SDRAM ECC MEMORY

It is not necessary to add memory in pairs. Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations. The Intel 925X chipset supports ECC 533 MHz (PC2-4300) DDR-2 memory or non ECC and ECC 400 MHz (PC2-3200) DDR-2 memory.

For best performance the total amount of memory loaded into Channel A and Channel B should be the same. If it is not, your computer will see all the RAM installed but will run the memory controller at a lower performance mode. For best performance, add the memory in pairs rather than as a single DIMM (two 512 MB DIMMs will have better performance than a single 1 GB DIMM). Also, add the memory into both channels (e.g. one in socket 1 and one in socket 3) to take advantage of dual channel performance. If you have unused slots within a channel, make them socket 2 and socket 4. This provides the best margin for the memory bus. Mixing ECC and non-ECC memory will mean that all memory will run as non-ECC. Mixing speeds will mean that the memory runs at the speed of the slowest DIMM.

MAXIMUM MEMORY

Supports up to 4 GB of DDR-2 SDRAM.

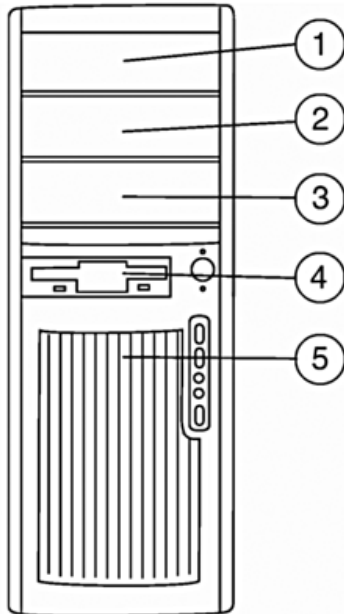
POSSIBLE MEMORY CONFIGURATIONS

Not all memory configurations possible are represented below.

DIMM Size	Slot			
	1	2	3	4
256 MB	256 MB			
256 MB (single channel performance configuration)	256 MB		256 MB	
1 GB	256 MB	256 MB	256 MB	256 MB
1 GB	512 MB		512 MB	
1.5 GB	256 MB	256 MB	512 MB	512 MB
2 GB	1 GB		1 GB	
2 GB	512 MB	512 MB	512 MB	512 MB
4 GB	1 GB	1 GB	1 GB	1 GB

Storage

Tower configuration



Convertible Minitower

Optional Diskette Drive

Optical Disk Drives

Hard Disk Drives

Quantity Supported

1

2

2 standard
(4 SATA w/AMO)
(3 SCSI w/AMO)

Position Supported

4

1, 2

5, 6

(and 2 or 3, for 3rd or 4th drives
using optical bays, adapter kit(s)
required)

Controller

Diskette

IDE

SATA (and/or optional SCSI)

Additional Technical Specifications

System Board	
Architecture	Intel Pentium 4 EM64T/PCI-E
Chipset	Intel 925X Express North bridge/ICH6R South bridge
Super I/O Controller	SMSC LPC47B397
System Board Form Factor	ATX
Processor Socket	LGA775
DIMM Connectors (DDR2, 1.8V)	4
AGP Connector (1.5V)	None
Integrated Graphics	None
PCI Connectors (5.0V)	4 full length 33 MHz 32-bit
PCI Express Connectors (v1.0a)	1 x 16 2 x 1
Flash ROM	Yes
AC97 integrated audio	Yes
CD ROM IN (Audio)	Yes
AUX IN (Audio)	Yes
Internal speaker	Yes
Clear CMOS Button	Yes
CPU Fan Header	Yes
Chassis Fan Header	Yes
Chassis Speaker Header	Yes
CMOS Battery Holder – Lithium	Yes
Hood Lock Header	Yes
Hood Sensor Header	Yes
Multibay Header	Yes
Integrated SATA RAID	<ul style="list-style-type: none"> ● Multiple Volume support to enable RAID 0 and RAID 1 on a single array ● Support for 2 RAID arrays on 4 ports ● Creation of 2 HDD array on two SATA ports. ● RAID 1 spare and auto-rebuild
Integrated Broadcom NetXtreme Gigabit ethernet for HP	Yes
Wake-On-Lan®	Yes
ASF 1.0 and 2.0 (Alert Standard Format)	Yes
Power Supply Header	Yes
Power Switch, Power LED & Hard Drive LED Header	Yes
Password Clear Header	Yes
Riser Connector	None
HDD activity LED Header	Yes
PCI extender that connects to System Board	None

Technical Specifications

Cooling	
Chassis Fan	92 mm
Processor Heatsink Fan	70 mm
Power Supply Fan	92 mm

Power Supply			
	Within 230V (115v/230V line switch)		
Full Ranging Input (Line Select Switch)	Yes		
Active Power Factor Correction (APFC) (Input Current is nearly 1/2 a non-APFC PS)	Yes		
Passive Power Factor Correction (PFC)	No		
Operating Voltage Range	90 – 264 VAC/118 VAC		
Rated Voltage Range	100 – 240 VAC		
Rated Line Frequency	50-60 Hz/400Hz		
Operating Line Frequency Range	47 – 66 Hz/393 – 407Hz		
Rated Input Current	6.4A/6.4A		
Maximum Rated Power	400 W Peak/360 W Continuous		
Heat Dissipation	Typical 737.1 btu/hr Maximum 1228.5 btu/hr		
Power Supply Fan	92mm variable speed		
PS Size	97.6 mm x 150 mm x 153.71 mm		
Energy Star Compliant	Yes		
FEMP Standby Power Compliant (<2W in S5 - Power Off)	No		
Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	2.5 W		
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V		
Typical configuration power consumption	1 processor (1x 3.4 GHz), 1 GB memory (2x512 MB) Two hard drives (2xSATA 40 GB), CD-ROM drive PCI-Express Graphics Card (FX 1300) Floppy, Monitor		
	Input Power consumption	@ 120Vac/60Hz	
	Typical operating mode (system busy)	216 W	= 737.1 btu/hr
	Windows XP Idle	138 W	= 470.9 btu/hr
	Standby mode (S3)	2.5 W	= 8.53 btu/hr
	Hibernate mode (S4)	2.1 W	= 7.166 btu/hr
	Power Off (S5)	2.1 W	= 7.166 btu/hr

Technical Specifications

ROM Features	Description
Instantly Available PC (Suspend to RAM – S3)	Allows for very low power consumption with quick resume time
ROM Based F10 Setup	Review and customize BIOS settings
Remote System Installation via F12 (PXE) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS
Auto Setup when New Hardware Installed	System automatically detects addition of new hardware
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, parallel, USB, audio, and network ports
Removable Media Write/Boot Control	Prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup
Memory Change Alert (Requires HP Client Manager Software)	Alerts management console if memory is removed or changed
Thermal Alert (Requires HP Client Manager Software)	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> ● NORMAL – normal temperature ranges ● ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown ● SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs
Master Boot Record Security	Detects changes to MBR and optional restoration, useful in protecting from viruses
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
Remote Wakeup	<ul style="list-style-type: none"> ● System administrators can power on, restart, and power off a client computer from a remote location. ● Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM
ACPI (Advanced Configuration and Power Management Interface)	<ul style="list-style-type: none"> ● Allows the system to wake from a low power mode ● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system Supports ACPI 2.0 for full compatibility with 64-bit operating systems
SMBIOS	System Management BIOS 2.3.5, previously known as DMI BIOS, for system management information

Technical Specifications

Other deployment & management features	
HP Client Management Solutions	<p>HP Client Management Solutions help simplify management of Workstations and significantly reduce total ownership costs. These solutions share a common design and are highly integrated due to the extensive work between HP and its partner Altiris.</p> <p>HP Client Manager Software is included free with all HP business PCs and Workstations. It enables central tracking, monitoring, and management of the hardware aspects of HP client systems:</p> <ul style="list-style-type: none"> ● Get valuable hardware information such as CPU, memory, video, and security settings ● Monitor system health to fix problems before they occur ● Install drivers and BIOS updates without visiting each PC ● Remotely configure BIOS and security settings ● Automate processes to quickly resolve hardware problems <p>Additional Altiris solutions (fee-based) are available to address Workstation management challenges through the entire IT lifecycle including:</p> <ul style="list-style-type: none"> ● Inventory assessment ● Software license compliance ● Personality migration ● Software image deployment ● Software distribution ● Asset management ● Client backup and recovery ● Problem resolution <p>Visit http://www.hp.com/go/easydeploy for more information, to download HP Client Manager Software, and to evaluate the Altiris solutions.</p>
System Software Manager (free)	A free utility that detects and updates BIOS, device drivers, and management agent versions on your networked PCs and workstations
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup
Software Restore CD	Restores computer to its original factory shipping image
Asset Tag	<ul style="list-style-type: none"> ● Repository for storing company-specific property asset numbers for easy tracking ● Initially set equal to the system serial number ● Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program
DIMM Serial Presence Detect	Detects whether or not memory DIMMs are present and their type
Hard drive serial number, model, and manufacturer	Hard drive manufacturer, model, and serial number is stored in the hard drive firmware and reported in ROM-based F10 setup
System serial number, model, & manufacturer	System serial number, model, & manufacturer stored in a non-volatile memory and can be retrieved with management SW or viewed in ROM-based F10 setup
ROM revision levels	Identifies system ROM revision levels and reports in ROM-based F10 setup Version is stored in an industry standard memory location (SMBIOS) so that management SW applications can use and report this information
System board revision level	<ul style="list-style-type: none"> ● Allows management SW to read revision level of the system board ● Revision level is digitally encoded into the HW and cannot be modified
Memory Change Alert (Requires HP Client Manager Software)	Alerts management console if memory is removed or changed
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen
Ultra ATA Integrity Monitoring (CRC Checking)	<p>A feature of SATA and SCSI, Cyclic Redundancy Checking provides data transfer verification and proactive notification of hard drive data transmission problems with recommendations for enhancing system performance. It detects all the following errors' types:</p> <ul style="list-style-type: none"> ● single bit errors ● double bit errors ● an odd number of errors ● error bursts up to 32-bits long

Technical Specifications

Drive Self Tests (DPS)	<ul style="list-style-type: none"> ● Drive Protection System (Adaptec and LSI SCSI controllers do not offer DPS) ● A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user. ● Running independently of the operating system, it can be accessed through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced. <p>The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures DPS Access through F10 Setup during Boot (F10 diagnostic access not available with SCSI drives)</p>
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	<p>Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count. By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure. SMART I – Drive Failure Prediction SMART II – Off-Line Data Collection SMART III – Off-Line Read Scanning with Defect Reallocation</p>

Security Features	
Padlock support	Padlock loop in rear of chassis. Locks side cover and secures chassis from theft. (0.22" diameter)
Cable Lock Support	Kensington lock slot in rear of chassis. Locks side cover and secures chassis from theft. (3mm x 7mm opening)
Universal chassis clamp lock support	Threaded feature in rear of chassis. Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable.
Solenoid lock and hood sensor	Yes
Rear port control cover (optional)	Locks rear IO cables to prevent cable theft.
Serial, Parallel, USB Enable/Disable	Enable or disable serial, parallel or USB ports and hide them from the operating system
Removable Media Write/Boot Control	Prevents the computer from being booted from removable media on supported devices (and can disable writes to media)
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration

System Software Updating	
Product Change Notification	<ul style="list-style-type: none"> ● Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. ● PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. ● Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
Remote Wakeup/Remote Shutdown	<ul style="list-style-type: none"> ● System administrators can power on, restart, and power off a client computer from a remote location. ● Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.
ROM Based Setup (F10) and Start-up Diagnostics	Yes
Support Software CD & WWW	Yes

Other Features	
ACPI-Ready Hardware	<p>Advanced Configuration and Power Management Interface (ACPI).</p> <ul style="list-style-type: none"> ● Allows the system to wake from a low power mode. ● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system

Technical Specifications

Serviceability Features of System	
Access panel	Tool-less, one-handed
Optical drives	Tool-less
Floppy drive	Tool-less
Hard drives	Tool-less
Expansion cards	Tool-less
Green user touch points	Yes, on tool-free internal chassis mechanisms
Color-coordinated cables and connectors	Yes
Memory	Tool-less, can be upgraded without removing any internal components
System board	Tool-less removal
Dual Color Power and HD LED on Front of Computer (Indicates Normal Operations and Fault Conditions)	green – normal red – fault
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS.
Configuration Record SW	Yes
Over-Temp Warning on Screen (Requires IM Agents)	Yes
OS CD (Restore OS CD)	Restores computer to its original factory shipping image
Restore CD	Restores the computer to its original factory shipping image
Flash ROM	Yes
3.3V Aux Power LED on System PCA	Yes
Dual Function 5V Aux Power LED (ON)/PS_ON LED (OFF) on System PCA	Yes
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder for easy Replacement	Yes
Processor ZIF Socket for easy Upgrade	Yes
DIMM Connectors for easy Upgrade	Yes
NIC LEDs (integrated) (Green & Amber)	Used to determine NIC status
ASF 1.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Dual function front power switch	Also acts as a reset switch when held for 4 seconds

Technical Specifications

Service and Support	<p>On-site Warranty and Service (Note 1): This three-year, limited warranty and service offering delivers three years of on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) 24 x 7. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering.</p> <p>NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.</p> <p>NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.</p> <p>NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.</p>
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Technical Specifications - Audio

AC97 Integrated ADI 1981B Type	Integrated
Audio	
AC '97 Stereo Codec	Yes
FM Synthesis Support	Yes – Yamaha XG Lite
OPL3 FM Synthesis Support	Yes
Sound Blaster Compatibility	Yes
Audio Jacks	Microphone-In (20-K ohm Input Impedance); rear stereo and front analog microphone ports Line-In (12-K ohm Input Impedance) Line-Out * (less than 800 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (2.5 Ohms Output Impedance, expects at least a 32 ohm load)
	NOTE: *Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally.
Sampling	7 kHz – 48 kHz
Wavetable Syntheses (software)	Yes – GM and FM Midi Support, Direct Music and Down Loadable Soundset (4 Meg DLS Level 1 and 2 Support)
3D Positional Sound	No
Digital Audio	Yes
Analog Audio	Yes
Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
Internal Audio Speaker Power Rating	3W
Internal Speaker	Yes
Hardware Equalizer for Internal Speaker	Fixed 7 Band ParametricEQ
External Speaker Jack (Line-Out)	Yes

Technical Specifications - Communications

HP Gigabit by Broadcom (BCM5782) NIC	Connector	RJ-45	
	Controller	Broadcom 5782 PCI LAN Controller	
	Memory	Integrated 96Kb frame buffer memory	
	Data rates supported	10/100/1000 Mbps	
	Compliance	IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
	Bus architecture	PCI 2.2	
	Data path width	32-bit, 33/66 MHz bus interface	
	Data transfer mode	Bus-master DMA	
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
	Power requirement	1.48 watts @ +3.3V AUX supply with 5V tolerance	
	Boot ROM support	Yes	
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps	
		10BASE-T (full-duplex) 20 Mbps	
		100BASE-TX (half-duplex) 100 Mbps	
		100BASE-TX (full-duplex) 200 Mbps	
		1000BASE-T, 1000 Mbps	
	Environmental	Operating temperature	32° to 131° F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Dimensions	4.7 x 2.0 x 0.08 in (12 x 5 x 1.9 cm)	
	Operating system driver support	Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP, Linux 2.2, Linux 2.4	
Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility		
Alerting	ASF 1.0		
Kit contents	Broadcom 5782, CD, Broadcom Gigabit Ethernet for HP, drivers, quick install guide, product warranty statement		

Technical Specifications - Communications

Intel Pro 1000 MT Gigabit NIC	Connector	RJ-45	
	Controller	Intel 82540EM Gigabit Controller	
	Memory	Integrated 96Kb frame buffer memory	
	Data rates supported	10/100/1000 Mbps	
	Compliance	IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
	Bus architecture	PCI 2.2	
	Data path width	32-bit, 33/66 MHz bus interface	
	Data transfer mode	Bus-master DMA	
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
	Power requirement	1.48 watts @ +3.3V AUX supply with 5V tolerance	
	Boot ROM support	Yes	
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps	
		10BASE-T (full-duplex) 20 Mbps	
		100BASE-TX (half-duplex) 100 Mbps	
		100BASE-TX (full-duplex) 200 Mbps	
		1000BASE-T, 1000 Mbps	
	Environmental	Operating temperature	32° to 131° F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Dimensions	6.4 x 4.8 x 0.8 in (16.3 x 12.1 x 1.9 cm)	
	Operating system driver support	Microsoft® Windows® NT® 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP, Linux 2.2, Linux 2.4	
Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Intel PROset II utility		
Kit contents	The Intel Pro 1000 MT NIC, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement		

Technical Specifications - Controllers

LSI Logic LSI20320 Ultra320 SCSI single channel host adapter	Bus architecture	PCI-X (backward compatible with PCI)
	Number of supported devices	Up to 15 SCSI devices
	Interface protocol	64 bit, 133MHz PCI-X
	Host bus transfer rate	Up to 1MB/s
	SCSI data transfer rate	Up to 320MB/s per channel
	SCSI Bus	Wide Ultra320, Low Voltage Differential, and Ultra Wide Single-Ended
	Internal connector	68-pin HD
	External connector	68 pin VHDCI
	Total connectors	2
	Plug and Play Support	No
	Dimensions (H x L)	6.6 x 2.5 in (16.9 x 6.4 cm)
	Approvals	CE, VCCI, Canada, C-Tick, FCC class B, UL 94VO
	Operating system support	Microsoft® Windows® XP
	Kit contents	Adaptec 39320D Ultra320 Dual Channel controller; operating system drivers; five-position, 68-pin LVD internal cable with terminator; three-position, 50-pin internal cable, user documentation, warranty card

Adaptec SCSI RAID 2120S Card	Dimensions (H x D)	2.5 x 6.6 in (6.4 x 16.8 cm) Low profile card
	RAID level	0, 1, 10, 5, 50, JBOD
	Data Transfer Rate	Up to 320 MB/s
	Cache Memory	64 MB (onboard)
	Device Support	Up to 15 SCSI devices
	Bus Type	64-bit/66 MHz PCI (Also support 32-bit/33 MHz PCI)
	Internal Connectors	One 68-pin high-density
	External Connectors	One 68-pin VHDCI
	System Requirements	Intel PC or equivalent with available PCI slot
	Operating Temperature	32° to 131° F (0° to 55° C)
	Power Requirements	4 amps @ +5V
	Operating System Support	Windows® 2000 Professional, Windows XP Professional
	Other	Optimized disk utilization Online RAID Level Migration Online capacity expansion Immediate RAID availability (background initialization) S.M.A.R.T. support

Technical Specifications - Hard Drives

7200 rpm Serial ATA Hard Drives 40GB

Capacity	40020664320 bytes	
Height	1 in (2.6 cm)	
Width	Media diameter: 3.5 in (8.9.x cm) Physical size: 4 in (10.2 cm)	
Interface	Serial ATA	
Synchronous Transfer Rate (Maximum)	150 MB/s	
Buffer	2 MB	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
	Average	8.5 ms
	Full-Stroke	18.0 ms
Rotational Speed	7,200 rpm	
Logical Blocks	78,165,360	
Operating Temperature	32° to 140° F (0° to 60° C)	

80GB

Capacity	80026361856 bytes	
Height	1 in (2.6 cm)	
Width	Media diameter: 3.5 in (8.9.x cm) Physical size: 4 in (10.2 cm)	
Interface	Serial ATA	
Synchronous Transfer Rate (Maximum)	150 MB/s	
Buffer	8 MB	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
	Average	8.5 ms
	Full-Stroke	18 ms
Rotational Speed	7,200 rpm	
Logical Blocks	156,301,488	
Operating Temperature	32° to 140° F (0° to 60° C)	

160GB

Capacity	160041885696 bytes	
Height	1 in (2.6 cm)	
Width	Media diameter: 3.5 in (8.9.x cm) Physical size: 4 in (10.2 cm)	
Interface	Serial ATA	
Synchronous Transfer Rate (Maximum)	150 MB/s	
Buffer	8 MB	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
	Average	8.5 ms
	Full-Stroke	18 ms
Rotational Speed	7,200 rpm	
Logical Blocks	312,581,808	
Operating Temperature	32° to 140° F (0° to 60° C)	

Technical Specifications - Hard Drives

	250GB	Capacity	250059350016 bytes	
		Height	1 in (2.6 cm)	
		Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA	
		Synchronous Transfer Rate (Maximum)	150 MB/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)		Single Track 0.8 ms
				Average <9.0 ms
				Full-Stroke ≤17 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	488,397,168	
		Operating Temperature	41° to 131°F (5° to 55°C)	
<hr/>				
10,000 rpm SATA Hard Drives	36GB	Capacity	37,019,566,080 bytes	
		Height	1.0 in (2.54 mm)	
		Width	Media diameter: 3.3 in (84mm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA	
		Synchronous Transfer Rate (Maximum)	150 MB/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)		Single Track 0.3 ms
				Average 4.5 ms
				Full-Stroke 10.2 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	72,303,840	
		Operating Temperature	41° to 131° F (5 to 55° C)	
	74GB	Capacity	74,355,769,344 bytes	
		Height	1.0 in (2.54 mm)	
		Width	Media diameter: 3.3 in (84mm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA	
		Synchronous Transfer Rate (Maximum)	150 MB/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)		Single Track 0.3 ms
				Average 4.5 ms
				Full-Stroke 10.2 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	145,226,112	
		Operating Temperature	41° to 140° F (5 to 60° C)	

Technical Specifications - Hard Drives

Ultra320 SCSI Hard Drives 73GB
(10,000 rpm)

Capacity	73,407,865,860 bytes	
Height	1.0 in (2.54 cm)	
Width	3.5 in (8.9 cm)	
Interface	68 pin LVD SCSI	
Synchronous Transfer Rate (Maximum)	320 MB/s	
Buffer	8 Mbytes	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	.3 msec
	Average	<4.5 msec
	Full-Stroke	<11.0 msec
Rotational Speed	10,000 rpm	
Logical Blocks	143,374,738	
Operating Temperature	40° F to 130° F (5° C to 55° C)	

Ultra320 SCSI Hard Drives 36GB
(15,000 rpm)

Capacity	36,420,075,520 bytes	
Height	1.0 in (2.54 cm)	
Width	3.5 in (8.9 cm)	
Interface	68 pin LVD SCSI	
Synchronous Transfer Rate (Maximum)	320 MB/s	
Buffer	8 Mbytes	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	.3 msec
	Average	<3.5 msec
	Full-Stroke	<9.0 msec
Rotational Speed	15,000 rpm	
Logical Blocks	71,132,960	
Operating Temperature	40° F to 130° F (5° C to 55° C)	

73GB

Capacity	73,407,865,856 bytes	
Height	1.0 in (2.54 cm)	
Width	3.5 in (8.9 cm)	
Interface	68 pin LVD SCSI	
Synchronous Transfer Rate (Maximum)	320 MB/s	
Buffer	8 Mbytes	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track	.3 msec
	Average	<3.5 msec
	Full-Stroke	<9.0 msec
Rotational Speed	15,000 rpm	
Logical Blocks	143,374,738	
Operating Temperature	40° F to 130° F (5° C to 55° C)	

Technical Specifications - Removable Storage

USB Disk on Key (Available Fall 2004)	Dimensions (HxWxD)	0.9 x 0.7 x 3.9 in (2.3 x 1.8 x 9.8 cm)
	Weight	0.05 lb (0.02 kg)
	USB Specification	1.1 and 2.0
	Transfer Rate	Read-1023 KB/Sec; Write-850 KB/Sec
	Storage Media	Solid state flash memory, no moving parts
	Power Supply	USB Bus-powered, no external power required
	Capacity	256 MB

Technical Specifications - Input/Output Devices

PS/2 OR USB '04 Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Electrical	Weight	2 lb (0.9 kg) minimum
		Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
	Mechanical	Microsoft® PC 99 - 2001	Functionally compliant
		Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
	Environmental	Acoustics	43-dBA maximum sound pressure level
		Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Operating system support	Windows® 2000 and Windows XP	
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, keyboard software media, installation guide, warranty card, safety and comfort	

Technical Specifications - Input/Output Devices

2-Button Scroll Mouse (PS/2)	Scroll Wheel	8 mm		
	Maximum Rotation Speed	30 mm/s		
	Switch Type	Light force micro-switch		
	Switch Life	1 million operations		
	Mechanical Life	Minimum 200,000 revolutions		
	Environmental	Operating Temperature	50° to 122° F (10° to 50° C)	
		Non-operating Temperature	-22° to 140° F (-30° to 60° C)	
		Operating Humidity	10% to 90% (non condensing at ambient)	
		Non-operating Humidity	20% to 80% (non condensing at ambient)	
		Operating Shock	40 g, 6 surfaces	
		Non-operating Shock	80 g, 6 surfaces	
		Operating Vibration	2 g peak acceleration	
		Non-operating Vibration	4 g peak acceleration	
		Mechanical	Resolution	400 ± 20% DPI
			Tracking Speed	10 in/s maximum
			Acceleration	100 in/s
			Switch Actuation	85 g nominal peak force
			Switch Life	1,000,000 operations (using Hasco modified tester)
	Cable Length		2 m	
	PC98-99		Mechanically compliant	
Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick			

HP Optical Scroll Mouse (USB)	Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	Weight	0.27 lb (0.12 kg)
	Cable length	72.8 in (185 cm)
	System requirements	Microsoft® Windows® 95, 98, 2000, Me, and XP

HP 3-Button Mouse (PS/2)	Dimensions/Weight	Height	1.42 in (3.6 cm)
		Length	4.17 in (10.7 cm)
		Width	2.87 in (7.4 cm)
		Weight	5.20 oz (150 g)
	Environmental	Operating temperature	32° to 104° F (0° to 40° C)
		Non-operating temperature	-4° to 140° F (-20° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
	Mechanical	Resolution	400 20% DPI
		Tracking speed	10 in/s Maximum
		Switch life	1,000,000 operations (using Hasco modified tester)
		Switch type	Micro-switches
		Tracking mechanism life	155 miles (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		PC98-99	Mechanically compliant

Technical Specifications - Input/Output Devices

Spaceball 5000 (USB)	Physical characteristics	Dimensions (H x W x D)	3.0 x 6.0 x 8.4 in (7.6 x 15.2 x 21.3 cm)
		Ball Diameter	2.2 in (5.6 cm)
		Weight	2.1 lb (9.94 kg)
		Features	Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) Certified for leading CAD and DCC applications
	Environmental	Operating temperature	50° to 104° F (10° to 40° C)
		Non-operating temperature	43° to 140° F (6° to 60° C)
		Operating humidity	8% to 80% (non-condensing at ambient)
		Non-operating humidity	5% to 80% (non-condensing at ambient)
	Mechanical	Buttons	12 programmable (unshifted)
		Ball Force Range	0.5 - 8.2N/1.8 - 29.5 oz
		Ball Torque Range	0.085 – 0.33 oz-in. (6.91 Nmm)
		Resolution	10 bits
	Serial Specifications	Connector	USB 1.1 or greater
		Cable Length	12.8 ft. (3.9 m)
		Data Rate	USB model – 16 msec
		Flow Control	Xon/Xoff (on PS/2 model only)
	Software Drivers Available	USB model	Microsoft Windows XP
	System Requirements	Disk Space	10 MB free disk space
	Regulatory Approvals	UL, cUL, EN 950, EN 60950, CSA, FCC, CE Mark, TUV, CISPR 22, EN 50082, IEC 1000 4-2, IEC 1000-4-3, AS/NZS, VCCI, BSMI, C-Tick	

HP SpaceMouse Plus USB	Physical characteristics	Dimensions (H x W x D)	7.4 x 4.72 x 1.73 in (18.8 x 12.0 x 4.4 cm)
		Cap Diameter	2 x 6.5 x 6.6 mm
		Weight	1.5 lb (0.68 kg)
		Features	Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) Certified for leading CAD and DCC applications
	Environmental	Operating temperature	41° to 140° F (5° to 60° C)
		Non-operating temperature	-13° to 158° F (-25° to 70° C)
		Operating humidity	10 to 98 % RH (non-condensing)
		Non-operating humidity	10 to 98 % RH (non-condensing)
	Mechanical	Buttons	11 programmable (unshifted)
		Cap Force Range	0.2 N – 4.5 N
		Cap Torque Range	4 Nmm to 100 Nmm
		Resolution	8 bit
	USB Specifications	Connector	USB 1.1 or greater
		Cable Length	2 m
		Data Rate	16 msec
	Software Drivers Available	Microsoft Windows XP	
	System Requirements	Disk Space	10 MB free disk space
	Regulatory Approvals	UL, cUL, EN 950, EN 60950, CSA, FCC, CE Mark, TUV, CISPR 22, EN 50082, IEC 1000 4-2, IEC 1000-4-3, AS/NZS, VCCI, BSMI, C-Tick	

Technical Specifications - Input/Output Devices

1394 Firewire FH/LP Card (PCI)	Device Interface Protocol	IEEE-1394a	
	Data Rate	100Mbps/s, 200Mbit/s and 400Mbps/s	
	Devices Supported	IEEE-1394 compliant devices	
	Connectors	Two IEEE1394 6-Pin Connector (Bracket Side) One 10-Pin (9 Contacts) Custom Connector (Internal)	
	Bus Interface	PCI	
	Physical	Low profile PCI card with a full height bracket	
	Environmental	Operating temperature	32° to 104° F (0° to 50° C)
		Non-operating temperature	-13° to 158° F (-25° to 70° C)
		Relative humidity	5% to 95%
		Ports	3 cable ports
	Minimum System Requirements	Microsoft XP Professional or Red Hat Linux 7.3/9.0 (Class Driver)	
		Pentium II 266 or faster	
		64-MB RAM	
Available PCI slot			
CD-ROM drive			
Regulatory Agency Approval	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC		

Technical Specifications - Optical Devices

48X CD-ROM Drive	Capacity	700 MB CD disc
	Dimensions (HxWxD)	1.63 x 5.83 x 7.27 in (4.13 x 14.6 x 18.5 cm)
	Weight	1.76 lb (0.8 kg)
	Interface	ATAPI/EIDE
	Mounting Orientation	Horizontal or vertical
	Data Transfer Rates - Read	Digital audio extraction (minimum) – 1,200 KB/s (8X) CD read – up to 7,200 KB/s (48X)
	Media and Formats - Read	Formats: CD-DA, CD-ROM (Mode 1 and 2), CD-XA Ready, Photo CD (Single and Multi-session), Mixed Mode (Audio and Data combined), CD-I (FMV), CD Plus, CD-Extra; Media: stamped, CD-R, CD-RW
	Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 0 (16.7 MB/s); UltraDMA Mode 2 (33.3 MB/s)
	Access Times (typical)	Random < 75 ms @ 48x Full-Stroke < 150 ms
	Start-up Time (typical)	< 7 s (single session) < 30 s (multisession)
	Stop Time (typical)	< 4 s
	Read Buffer size	128 KB (minimum)
	Audio Output	Line-Out 0.7 VRMS Signal-to-Noise Ratio 80 dB Channel Separation 65 dB
	Configuration Jumper Block	Master, slave, and cable select modes
	Operating Conditions	Temperature 41° to 122° F (5° to 50° C) Humidity 10% to 80%
	Approvals/ Environmental	UL 1950 (US and Canada), CSA, SEMKO, TUV; CE, FDA, FCC, IC, C-TICK
	Operating Systems Supported	Microsoft Windows 2000 and Microsoft Windows XP
	Supplied Software	None

Technical Specifications - Optical Devices

16X/40X DVD-ROM Drive with +R Read Support	Height	5.25-in, half-height, tray load	
	Interface Type	ATAPI/EIDE	
	Dimensions (W x H x D)	5.88 x 1.71 x 7.87 [max] in (149.5 x 43.25 x 200.0 [max] mm) (external, excluding bezel)	
	Disc Formats	DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW	
	Disc Capacity	DVD-ROM	4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R)
		CD-ROM	540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)
	Access Times (typical reads, including settling)	DVD-ROM Single Layer	120 ms
		CD-ROM Mode 1	90 ms
		Full Stroke DVD	240 ms (seek)
		Full Stroke CD	160 ms (seek)
		Startup Time	< 10 seconds (typical)
		Stop Time	< 4 seconds
		Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)
	Maximum Data Transfer Rates	CD-ROM Read	6000 KB/s (40X) Max
		DVD-ROM Read	21,600 KB/s (16X) Max
		Digital Audio Extraction	6000 KB/s (40X) Max
	Power	Source	Four-pin, DC power receptacle
		DC Power Requirement	5 VDC \pm 5% – 100 mV ripple p-p
			12 VDC \pm 5% – 200 mV ripple p-p
		DC Current	5 VDC – <800 mA typical, < 1000 mA maximum 12 VDC – < 870 mA typical, <1800 mA maximum
	Audio Output	Line-Out	0.7 VRMS
		Signal-to-Noise Ratio	85 dB
Channel Separation		65 dB	
Configuration Jumper Block	Master, slave, and cable select modes		
Data Interface Connector	40-pin, shrouded and keyed, flat ribbon		
Operating Environmental (all conditions non-condensing)	Temperature (operating)	41° to 122° F (5° to 50° C)	
	Relative Humidity (operating)	10% to 85%	
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)	
Certifications, Approvals	MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, EMKO EN60950, EN 60825-1, UL 60950, CSA C22.2 60950-2000, CFR 21 part 1040 class 1, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, ANSI C63.4-1992		
Operating Systems Supported	Microsoft Windows 2000, Windows XP Professional		
Kit Contents	16X/40X DVD-ROM Drive, InterVideo WinDVD MPEG Movie Playback software, audio cable, and installation guide.		

Technical Specifications - Optical Devices

HP 48X CD-RW	Height	5.25-inch, half-height, tray-load
	Mounting Orientation	Horizontal or vertical
	Interface	ATAPI/EIDE
	Dimensions (HxWxD)	1.63 x 5.75 x 7.27 [max] in (4.13 x 14.6 x 18.5 [max] cm) (external, excluding bezel)
	Weight (max)	2.0 lb (0.9 kg)
	Read Only Disc Parameters	<p>Data Transfer Rates – Read Digital audio extraction (minimum) – 1,800 KB/s (12X) CD read – up to 7,200 KB/s (48X)</p> <p>Media and Formats – Read Formats: CD-DA, CD-ROM (Mode 1 and 2), CD-ROM XA (Mode 2, Form 1 and 2), Mixed Mode, CD-Plus, CD-Extra, CD-I FMV, Video CD, CD-Text, Photo CD (single and multisession) Media: stamped, CD-R, CD-RW</p>
	Writeable Disc Parameters	<p>Data Transfer Rates – Write CD-R write – 2100 KB/s (14X) to 7200 KB/s (40X) CD-RW write – 600 KB/s (4X) CD-RW write (high speed) – 1500 KB/s (10X) to 1800 KB/s (12X) CD-RW write (ultra high speed) – 2400 KB/s (16X) to 4800 KB/s (32X)</p> <p>Media and Formats – Write Formats: CD-DA, CD-ROM (Mode 1 and 2), CD-ROM XA (Mode 2, Form 1 and 2), Mixed Mode, CD-Plus, CD-Extra, CD-I FMV, Video CD, CD-Text Media: CD-R, CD-RW (including ultra-speed)</p> <p>Write Methods Disc-at-once, session-at-once,, track-at-once, incremental fixed and variable packet, multisession</p>
	Access Times (typical reads, including settling)	<p>CD-ROM Mode 1 125 ms</p> <p>Full Stroke CD 210 ms (seek)</p> <p>Start-up Time (typical) <7 s (single session), <30 s (multisession)</p> <p>Stop Time (typical) <4 s</p> <p>Write Buffer Size 2 MB</p> <p>Data Transfer Modes PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 2 (33.3 MB/s)</p>
	Power	<p>Source Four-pin, DC power receptacle</p> <p>DC Power Requirement 5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p</p> <p>DC Current 5 VDC (< 1000 mA typical, < 1600 mA maximum) 12 VDC (< 600 mA typical, < 1400 mA maximum)</p> <p>Total Drive Power (standby mode) < 2.5 Watt</p>
	Audio Output	<p>Line-Out 0.7 VRMS</p> <p>Signal-to-Noise Ratio 74 dB</p> <p>Channel Separation 65 dB</p>
Configuration Jumper Block	Master, slave, and cable select modes	
Operating Conditions	<p>Temperature 41° to 122° F (5° to 50° C)</p> <p>Humidity 10% to 90% 10% to 90%</p>	

Technical Specifications - Optical Devices

Approvals/ Environmental	MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec SFF-8020, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft ®PC2001 certification, Microsoft Logo for Windows® XP and 2000.
Operating Systems Supported	Microsoft Windows® 2000, Windows XP Professional
Supplied software	Roxio Easy CD & DVD Creator: Create or copy CDs and DVDs, including music and data CDs, and data DVDs Dantz Retrospect Express: Back up systems to CD, DVD, or tape media.

48X Combo CD-RW/DVD-ROM	Height	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	ATAPI/EIDE	
	Dimensions (W x H x D)	5.77 x 1.71 x 7.87 [max] in (14.66 x 4.34 x 20.0 [max] cm) (external, excluding bezel)	
	Weight (max)	2.6 lb (1.2 kg)	
	Read Only Disc Parameters	Formats and Modes Supported	CD-ROM-Mode 1; CD-ROM XA-Mode 2 (forms 1 and 2); CD-Bridge; CD digital audio; CD Extra; CD-I-Mode 2 (forms 1 and 2) and CD-I-Ready; Photo CD (single and multi-session); video CD; DVD (single- and double-layer); DVD-R; DVD-RW; DVD-RW Multi-Border; DVD+R; DVD+R Multisession , and DVD+RW
		Capacity	180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)
		CD-ROM, CD-R, CD-RW read	7200 KB/s (48X) Max
		DVD ROM read	21,632 KB/s (16X) Max
	Writeable Disc Parameters	Disc Type	CD-R and CD-RW
		Write Methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
		Format and Modes Supported	CD-ROM (mode 1); CD-ROM XA (mode 2, forms 1 and 2); CD digital audio, CD-I (mode 2, forms 1 and 2); video CD; CD-Bridge; Video CD
		Capacity	180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (mode 2, 12 cm)
	Access Times (typical reads, including settling)	CD-R write	7200 KB/s (48X) Max
	CD-RW write	4800 KB/s (32X) Max	
	Random DVD	< 140 ms (typical)	
	Random CD	< 125 ms, (typical)	
	Full Stroke DVD	< 250 ms (seek)	
	Full Stroke CD	< 210 ms (seek)	
	Startup Time (single)	< 7 seconds (typical)	
	Startup Time (multi-session)	< 30 seconds (typical)	
	Stop Time	< 4 seconds	
	Cache Buffer	2 MB (minimum)	
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 44 Mbytes/s (default)	

Technical Specifications - Optical Devices

Power	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC \pm 5%-100 mV ripple p-p 12 VDC \pm 5%-200 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, < 1600 mA maximum) 12 VDC (< 600 mA typical, < 1400 mA maximum)
	Total Drive Power (standby mode)	< 2.5 Watt
Audio Output	Line-Out	0.7 VRMS
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
Configuration Jumper Block	Master, slave, and cable select modes	
Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative humidity	10% to 90%
	Maximum wet bulb temperature	86° F (30° C)
Certifications, Requirements	MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec SFF-8020, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft® PC2001 certification, Microsoft Logo for Windows® XP and 2000.	
Operating Systems Supported	Microsoft Windows 2000, Windows XP Professional	
Option Kit Contents	48X Combo CD-RW/DVD-ROM Drive, Roxio Easy CD & DVD Creator, InterVideo WinDVD MPEG Movie Playback software, Dantz Retrospect Express Backup software, audio cable, and installation guide.	

8X DVD+R/+RW	Height	5.25-inch, half-height, tray-load		
	Orientation	Either horizontal or vertical		
	Interface Type	ATAPI/EIDE		
	Disc Recording Capacity	4.7 GB		
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
	Weight (max)	2.6 lb (1.2 kg)		
	Recording Method	Disc-at-once, Track-at-once, and Session-at-once; Variable Packet and Fixed Packet		
	Write Support	DVD+R, DVD+RW, CD-R, CD-RW		
	Read Support	DVD-ROM (single- and dual-layer), DVD-Video, DVD+R (include multisession), DVD+RW, DVD-R (incl. multiborder), DVD-RW; CD-ROM Mode 1, CD-ROM XA (Mode 2, forms 1 and 2), CD-TEXT, Photo CD single- and multi-session), CD-DA (Audio CD), CD-Extra, CD-R, CD-RW (supports AM2), VCD		
	Write Speed (max)	DVD+R	8X CLV (10800 KB/s)	
		DVD+RW	4X CLV (5400 KB/s)	
		CD-R	24X CLV (3600 KB/s)	
		CD-RW	10X CLV (1500 KB/s)	
	Read Speed (max)	DVD-ROM	12X CAV (6750 to 16200 KB/s)	
DVD+R, DVD+RW,		8X CAV (5400 to 10800 KB/s)		
CD-ROM, CD-R, CD-RW, CD-Audio		40X CAV (2550 to 6000 KB/s)		

Technical Specifications - Optical Devices

Access Time (typical reads, including settling)	Random DVD	< 140 ms (typical)
	Random CD	< 125 ms, (typical)
	Full Stroke DVD	< 250 ms (seek)
	Full Stroke CD	< 210 ms (seek)
	Startup Time (single)	< 7 seconds (typical)
	Startup Time (multi-session)	< 30 seconds (typical)
	Stop Timex	< 4 seconds
	Cache Buffer	2 MB (minimum)
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 2 33 Mbytes/s (default)
	Power	Source
DC Power Requirement		5 VDC \pm 5%-100 mV ripple p-p 12 VDC \pm 10%-200 mV ripple p-p
DC Current		5 VDC (< 2000 mA typical, < 2500 mA maximum) 12 VDC (< 700 mA typical, < 2000 mA maximum)
Total Drive Power (standby mode)		< 2.5 Watt
Audio Output	Line-Out	0.7 VRMS
	Signal-to-Noise Ratio	75 dB
	Channel Separation	55 dB
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative humidity	10% to 90%
	Maximum wet bulb temperature	86° F (30° C)
System Configuration	Intel® Pentium® III Processor or later with 128 MB of memory (required); 256 MB recommended 2-D or 3-D graphics cards on primary disk drive for operating system and application software; second disk drive for audio and video data	
Operating Systems Support	Microsoft® Windows® 2000, Windows XP Professional, Windows XP Home	
Regulatory Approvals	MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec T13.1153D, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft® PC2001 certification, Microsoft Logo for Windows® XP and 2000.	
Option Kit contents	DVD+R/+RW Drive, InterVideo WinDVD, InterVideo WinDVD Creator, Roxio Easy CD Creator, Dantz Retrospect Express Backup Software, installation guide, and DVD+R media.	

Technical Specifications - Graphics

NVIDIA Quadro 280 NVS (PCI)	Form Factor	ATX
	Graphic Controller	Integrated Quadro 280 2-D graphics processor unit (GPU)
	VGA controller	Integrated into the Quadro GPU
	Bus type	PCI
	RAMDAC	Dual 350 MHz
	Memory	64 MB DDR with frame buffer and Texture storage
	Connector	Single High-density Flex Connector
	Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
	Controller clock speed	275 MHz
	Color planes	32-bit color buffer
	Overlay planes	1 16-bit Video overlay plane
	Maximum vertical refresh rate	120 Hz
	Maximum pixel clock	350 MHz
	Multi-monitor support	Dual analog or digital monitors
	Single DVI Support	Yes
	Dual DVI Support	Yes
	High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	Available graphics drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) Red Hat Linux HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html .
	Maximum resolution	2048 x 1536 analog 1600 x 1200 digital

Technical Specifications - Graphics

<p>NVIDIA Quadro NVS 280 Graphics Card (PCI-Express)</p>	<p>Form Factor</p> <p>Graphics Controller</p> <p>VGA controller</p> <p>Bus Type</p> <p>RAMDAC</p> <p>Memory</p> <p>Connectors</p> <p>Multi-monitor support</p> <p>Additional product features</p>	<p>ATX</p> <p>Integrated Quadro 280 2-D graphics processor unit (GPU)</p> <p>Integrated into the Quadro GPU</p> <p>PCI-Express x16 or PCI</p> <p>Dual 350 MHz integrated</p> <p>64 MB 000 MHz DDR SDRAM unified frame buffer, Z-buffer and Texture storage</p> <p>Single High-density Flex Connector</p> <p>Dual integrated analog display controllers supporting up to two analog displays at 1920 x1200 @ 85Hz or two digital displays at 1600x1200 @ 60Hz</p> <p>Controller clock speed 250 MHz</p> <p>Color planes 32-bit color buffer</p> <p>Overlay planes 1 16-bit Video overlay plane</p> <p>Maximum vertical refresh rate 120 Hz</p> <p>Maximum pixel clock 350 MHz</p> <p>Single DVI Support Yes</p> <p>Dual DVI Support Yes</p> <p>High-definition Video Processor (HDVP)</p> <p>Full-screen, full-frame video playback of HDTV and DVD content</p> <p>DVD-ready motion compensation for MPEG-2</p> <p>Independent hardware color controls for video overlay</p> <p>Hardware color-space conversion (YUV 4:2:2 and 4:2:0)</p> <p>IDCT motion compensation</p> <p>5-tap horizontal by 3-tap vertical filtering</p> <p>8:1 up/down scaling</p>
<p>PCI-Express</p>	<p>Supports X16 PCI-E</p>	
<p>Available graphics drivers</p>	<p>Microsoft Windows® XP or Windows 2000 (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode)</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html.</p>	
<p>Maximum resolution</p>	<p>2048 x 1536 analog</p> <p>1600 x 1200 digital</p>	

Technical Specifications - Graphics

NVIDIA Quadro FX 330 Graphics Card	Form Factor	ATX
	Graphics Controller	NVIDIA Nv37GL
	Bus Type	PCI-Express x16
	Memory	64 MB 000 MHz DDR SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DMS-59 output supporting up to two analog or digital (with optional cable) displays
	Multi-monitor support	Dual integrated analog display controllers supporting up to two analog displays at 2048 x1536 @ 60Hz or two digital displays at 1600x1200 @ 60Hz
	RAMDAC	Dual 350 MHz integrated
	Architecture features	64-bit memory interface
		128-bit IEEE floating-point precision graphics pipeline
		128-bit color precision
		12-bit sub-pixel precision
		4x FSAA at 1024x768
		Hardware accelerated antialiased points and lines
		Hardware OpenGL overlay planes
		Hardware accelerated two-sided lighting
Hardware accelerated clipping planes		
Hardware accelerated occlusion culling		
3D volumetric texture support		
Shading architecture	Fully programmable GPU Optimized compilers for Cg, OpenGL shading language, and Microsoft HLSL	
Supported graphics APIs	OpenGL 1.5 DirectX 9.0	
Available graphics drivers	HP-tested: Microsoft Windows® XP, Windows 2000, and Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html .	
Maximum Resolution	Dual DVI-I output with optional cable – drives dual digital displays at resolutions up to 1600x1200 @ 60Hz Internal 350MHz RAMDACs – drives dual analog displays up to 2048x1536 @ 60Hz each	

Technical Specifications - Graphics

ATI FireGL V3100 Graphics Card	Form Factor	ATX
	Graphics Controller	RV370
	Bus Type	PCI-Express x16
	Memory	128MB 200MHz DDR unified frame buffer, Z-buffer and Texture storage
	Connectors	1 DVI-I analog/digital and 1 VGA analog monitor output
	Multi-monitor support	Dual integrated display controllers supporting up to 2048x1536 @ 85Hz on both displays
	RAMDAC	Dual 400 MHz integrated
	Architecture features	128-bit memory interface 128-bit IEEE floating-point precision 24-bits per RGBA color precision 4-bit sub-pixel precision 2 parallel geometry engines 4 parallel pixel pipelines 2x/4x/6x FSAA Hardware accelerated antialiased points and lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes Hardware accelerated occlusion culling Hardware accelerated clip planes
	Shading architecture	Smartshader™ technology Programmable pixel and vertex shaders 16 textures per pass Pixel shaders up to 160 instructions with 32-bit floating point precision for each RGBA component Multiple render target support Shadow volume rendering acceleration High precision 10-bit per channel frame buffer support
	Supported graphics APIs	OpenGL 1.5 DirectX 9.0
	Available graphics drivers	HP-tested: Microsoft Windows® XP, Windows 2000, and Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html .
	Maximum Resolution	DVI-I output – drives digital display at resolutions up to 1600x1200 Internal 400MHz RAMDACs – drives dual analog displays up to 2048x1536 @ 85Hz each

Technical Specifications - Graphics

NVIDIA Quadro FX 1300 Graphics Card

Form Factor	ATX
Graphics Controller	NVIDIA NV38GL
Bus Type	PCI-Express x16
Memory	128 MB 275 MHz DDR SDRAM unified frame buffer, Z-buffer and Texture storage
Connectors	2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output
Multi-monitor support	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 60Hz on both displays or dual digital displays at 1600x1200 @ 60Hz NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows
RAMDAC	Dual 400 MHz integrated
Architecture features	256-bit memory interface 128-bit IEEE floating-point precision graphics pipeline 128-bit color precision 12-bit sub-pixel precision 4x FSAA at 1280x1024 Hardware accelerated antialiased points and lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes Hardware accelerated occlusion culling 3D volumetric texture support Quad-buffered stereo
Shading architecture	Fully programmable GPU Optimized compilers for Cg, OpenGL shading language, and Microsoft HLSL
Supported graphics APIs	OpenGL 1.5 DirectX 9.0
Available graphics drivers	HP-tested: Microsoft Windows® XP, Windows 2000, and Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html .
Maximum Resolution	Dual DVI-I output – drives dual digital displays at resolutions up to 1600x1200 @ 60Hz Internal 400MHz RAMDACs – drives dual analog displays up to 2048x1536 @ 75Hz each

Technical Specifications - Graphics

ATI FireGL V5100 PCI-Express Graphics Controller	Form Factor	ATX
	Graphics Controller	RV423
	Bus Type	PCI-Express x16
	Memory	128 MB 350MHz DDR unified frame buffer, Z-buffer and Texture storage
	Connectors	2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output
	Multi-monitor support	Dual integrated display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays.
	RAMDAC	Dual 400 MHz integrated
	Architecture features	256-bit memory interface 128-bit IEEE floating-point precision 24-bits per RGBA color precision 8-bit sub-pixel precision 6 parallel geometry engines 12 parallel pixel pipelines 2x/4x/6x FSAA Hardware accelerated antialiased points and lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes Hardware accelerated occlusion culling Hardware accelerated clip planes Quad-buffered stereo
	Shading architecture	Smartshader™ technology Programmable pixel and vertex shaders 16 textures per pass Pixel shaders up to 160 instructions with 32-bit floating point precision for each RGBA component Multiple render target support Shadow volume rendering acceleration High precision 10-bit per channel frame buffer support
	Supported graphics APIs	OpenGL 1.5 DirectX 9.0
	Available graphics drivers	HP-tested: Microsoft® Windows® XP, Windows 2000, and Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html .
	Maximum Resolution	DVI-I output – drives digital displays at resolutions up to 1600x1200 Internal 400MHz RAMDAC – drives dual analog displays up to 2048x1536 @ 85Hz each

Technical Specifications - Monitors

HP CRT Monitor p1230	Tube	Type	Diamondtron NF Aperture Grille CRT
		Tube Size (diagonal)	22 in (55 cm)
		Viewable Image Area (diagonal)	20 in (51 cm)
		Aperture Grille Pitch	0.24 mm
		Screen Curvature	Flat
Signal Interface/ Performance		Horizontal Frequency	30 to 140 kHz
		Vertical Frequency	50 to 160 Hz
		Maximum Resolution	2048 x 1536 @ 85 Hz (GTF)
		Recommended Resolution	1600 x 1200 @ 85 Hz or 1280 x 1024 @ 85 Hz
		Preset VESA Graphic Modes (non-interlaced)	1920 x 1440 @ 60 Hz, 75 Hz
			1792 x 1344 @ 60 Hz, 75 Hz
			1600 x 1200 @ 75 Hz, 85 Hz
			1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz
			1024 x 768 @ 75 Hz, 85 Hz
			800 x 600 @ 75 Hz, 85 Hz
			640 x 480 @ 60 Hz, 85 Hz
		Preset MAC Mode	1152 x 870 @ 75 Hz
		Preset VGA Mode	640 x 480 @ 60 Hz and 720 x 400 @ 70 Hz
		Maximum Pixel Clock Speed	420 MHz
		User Programmable Modes	15 (10 preset modes and 5 additional modes)
	Anti-Glare	Yes	
	Anti-Static	Yes	
	AssetControl	Yes	
	Default Color Temperature	9300 K	
On Screen Display (OSD) Controls	Buttons or Switches	OSD menu, brightness, contrast, Super Bright, dual input, power on/off	
	Languages	English, Spanish, French, German, Italian, Japanese	
	User Controls	Brightness, contrast, pincushion, pincushion balance, trapezoid, tilt (rotation), color temperature, degauss, parallelogram, individual color control, zoom, moiré cancellation, convergence, corner purity, image control, language, OSD control, factory reset	
Video Input	Plug and Play	Yes, DDC/CI compatible	
	Input Signal	Two 15-pin D-sub connections	
	Input Impedance	75 ohms	
	Sync Input	Separate sync (HSYNC/VSYNC)	
	Video Cable	Detachable 15-pin D-sub mini connector (included)	
	Video Cable Length	70 in (1.8 m); non-captive	
Power	Power Supply	Universal 100-120/220-240 VAC	
	Frequency	50/60 Hz	
	Maximum	135 watts	
	Power Saving	2 watts maximum	
	Off Mode	0 watts	
	Power Cable Length	70 in (1.8 m); non-captive	

Technical Specifications - Monitors

Mechanical	Dimensions (H x W x D)	Unpacked (including pedestal)	19.1 x 19.5 x 18.8 in (48.6 x 49.5 x 47.7 cm)	
		Packaged	25.6 x 25.0 x 25.4 in (65.1 x 63.6 x 64.6 cm)	
	Tilt Range	Unpacked	66.1 lb (30 kg)	
		Packaged	77.1 lb (35 kg)	
		Swivel Range		10° upward and 5° downward
		Temperature - Operating		90° either side of center
Environmental	Temperature - Operating		41° to 90° F (5° to 35° C) non-condensing	
	Temperature - Non-operating		-4° to 140° F (-20 to 60° C)	
	Humidity - Operating		10% to 90% non-condensing	
	Humidity - Non-operating		10% to 90%	
	Altitude - Operating		0 to 7,200 ft (0 to 2,195 m)	
	Altitude - Non-operating		0 to 30,000 ft (0 to 9,144 m)	
Other	Accessories Included		Power cable, video cable (D-sub to D-sub), documentation kit	
	User Guide Languages		English, French, German, Spanish, Italian, Dutch, Brazilian Portuguese, Danish, Finnish, Greek, Japanese, Korean, Latin American Spanish, Norwegian, Polish, Russian, Slovenian, Turkish, Swedish, Traditional Chinese, Simplified Chinese	
	Warranty Languages		English, French, Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Japanese, Korean, T. Chinese, S. Chinese	
Certification and Compliance	Color		Carbon and silver	
	MPR-II (Low Emissions), TCO '03, *Energy Star Compliant, UL Listing, ISO9241-3 VOT Guidelines Approval, FCC Approval, CE Mark (including PFC), GS Mark * Energy Star Compliant available summer of 2004.			
Service and Warranty	Limited three-year parts and repair labor, service provider labor, and on-site service. Next business day advanced exchange direct replacement service available during warranty period. Certain restrictions and exclusions apply.			

Technical Specifications - Monitors

HP Flat Panel Monitor L1925	Panel	Type	Thin film transistor (TFT)
		Viewable Image Area (diagonal)	19 in (48.25 cm) maximum viewable
		Screen Opening (WxH)	14.9 x 11.9 in (37.8 x 30.3 cm)
		Viewing Angle (typical)	170 degrees horizontal/170 degrees vertical (10:1 minimum contrast ratio)
		Brightness (typical)	Up to 250 nits (cd/m ²)
		Contrast Ratio (typical)	Up to 500:1 (typical)
		Response Rate (typical)	<20 ms (typical rise + fall)
		Pixel Pitch	0.294 mm
		Color Depth Support	16.7 million colors
	Video Input	Plug and Play	Yes (supports VESA DDC2B; PC2001 compliant)
		Input Signal	Two connectors: one 15-pin mini D-sub analog VGA; and one DVI-I (VGA analog or digital)
		Input Impedance	75 ohms ± 2%
		Sync Input	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green
		Video Cable	VGA and DVI-D
		Video Cable Length	78 in (2.0 m)
	Signal Interface/ Performance	Horizontal Frequency	30 to 82 kHz
		Vertical Frequency	56 to 75 Hz
		Graphics Controller	Pixelworks 131
		Native Resolution	1280 x 1024 @ 75 Hz analog 1280 x 1024 @ 60 Hz digital
		Maximum Resolution (Analog)	1280 x 1024 @ 75 Hz analog
		Maximum Resolution (Digital)	1280 x 1024@75Hz analog
	On Screen Display (OSD) Controls	Preset VESA Graphic Modes (non-interlaced)	640 x 480 @ 60 Hz, 72 Hz, 75 Hz 800 x 600 @ 60 Hz, 72 Hz, 75 Hz 1024 x 768 @ 60 Hz, 75 Hz 1280 x 1024 @ 60 Hz, 75 Hz
		Preset MAC Mode	832 x 624 @ 75 Hz 1152 x 870 @75 Hz
		Preset VGA Mode	640 x 480 @ 60 Hz, 72 Hz
		Preset SUN Mode	1152 x 900 @ 66 Hz
		Fail Safe Mode	Yes (limits out of range signal messages)
		Maximum Pixel Clock Speed	140 MHz
		User Programmable Modes	Yes, 10
		Anti-Glare	Yes
		Anti-Static	Yes
		AssetControl	Yes (accessible on HP/Compaq desktops featuring Intelligent Manageability)
		Default Color Temperature	Yes (6500k, 9300k, Custom User)
		Buttons or Switches	Power on/off; 4-button OSD; second level OSD buttons include auto adjust and dual-input switch

Technical Specifications - Monitors

	Languages	English, Spanish, French, German, Dutch, Italian
	User Controls	Size and Positioning Contrast Brightness Clock, Clock Phase Selectable Color Temperature Input Selection Factory Reset Individual Color Contrast
Power	Power Supply	Auto-ranging, 90 to 265 VAC; internal power supply, 47.5-63 Hz
	Input Power	100 ~ 240 VAC
	Nominal Current	1.5 A maximum
	Frequency	50 ~ 60 Hz
	Average	33 W when displaying standard office software
	Maximum	< 40 W
	Power Saving	< 2 W
	Off Mode	< 1 W (switch off)
	Power Cable Length	70 in (1.8 m); non-captive
Mechanical	Dimensions (H x W x D)	Unpacked with stand minimum height 14.8 x 16.4 x 8.2 in (39.8 x 41.6 x 20.8 cm) Unpacked with stand maximum height 20 x 16.4 x 8.2 in (50.8 x 41.6 x 20.8 cm) Base Area 8.2 x 12.2 in (Footprint d x w) (20.8 x 30.9 cm) Panel only (without stand) (h x w x d) 13.5 x 16.4 x 2.6 in (34.2 x 41.6 x 6.6 cm)
	Weight	Unpacked with stand 17.6 lb (8 kg) Unpacked without stand 12 lb (5.5 kg) Packaged 23.5 l (10.7 kg)
	Tilt Range	-5° to +20°
	Swivel Range	± 45° horizontal swivel
	Height Adjustable	Yes (4.3 in/110 mm adjustment range)
	Pivot Rotation	Yes, 90 °
	Base	Ships attached and is removable after installation
Environmental	Temperature – Operating	41° to 95° F (5° to 35° C)
	Temperature – Non-operating	-4° to 140° F (-20° to 60° C)
	Humidity – Operating	20% to 80%
	Humidity – Non-operating	5% to 95%
	Altitude – Operating	0 to 13,000 ft (0 to 4,000 m)
	Altitude – Non-operating	0 to 40,000 ft (0 to 12,192 m)
		Full-screen Resolution
Options	PC Comm Station	Communication/audio hub that includes two stereo speakers (8 PMPO each), integrated microphone/dual function headset (phone and PC support), and USB port. Optional, part number 304251-008 (US) or P8814A (EMEA).
Other	Accessories Included	VGA cable, DVI-D cable, user CD-ROM with Portrait software
	User Guide Languages	English
	Warranty Languages	English

Technical Specifications - Monitors

Color	Carbon/Silver
VESA Mounting	Yes (swing arm/ wall mount not included; base is shipped attached and must be removed for mounting options)
VESA External Mounting	Yes (Standard 4 hole pattern, 100 mm)
Kensington Lock-ready	Yes
Certification and Compliance	VESA Video Signal Standard (VSIS) Compliant video cards have been tested and proven compatible for use with the HP Flat Panel Monitor L1925. NOTE: Features are subject to change without notice.
Service and Warranty	Limited three-year parts and repair labor, service provider labor, and on-site service. Next Business Day advanced exchange direct replacement service available during warranty period. Certain restrictions and exclusions apply. For details, contact HP Customer Support at 1-800-HP-INVENT (USA and Canada).

HP Flat Panel Monitor L2035	Panel	Type	20-inch Active Matrix TFT (thin film transistor)
		Viewable Image Area (diagonal)	20.1 in (51 cm)
		Screen Opening (W x H)	16.2 x 12.17 in (41.1 x 30.9 cm)
		Viewing Angle (typical)*	Up to 170° H/170° V (10:1 minimum contrast ratio)
		Brightness (typical)*	Up to 250 nits (cd/m ²)
		Contrast Ratio (typical)*	Up to 400:1
		Response Rate (typical)*	16 ms (typical, rise + fall)
		Pixel Pitch	0.255 mm
		Color Depth Support	16.7 million colors
On Screen Display (OSD) Controls	Buttons or Switches	PiP (Picture in Picture), Input select, auto adjust, OSD up, OSD down, OSD menu select, power	
	Languages	English, French, German, Spanish, Italian	
	User Controls	Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, video picture-in-picture (size and position), input selection (includes separate direct access key for dedicated swap between inputs 1 and 2), factory reset	
Signal Interface/ Performance	Horizontal Frequency	30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz)	
	Vertical Frequency	48 to 85 Hz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz)	
	Graphics Controller	Pixelworks PW171	
	Native Resolution	1600 x 1200 @ 60 Hz (recommended)	
	Preset VESA Graphic Modes (non-interlaced)		1600 x 1200 @ 60 Hz, 75 Hz (VGA input)
			1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz
			1280 x 960 @ 60 Hz
			1152 x 900 @ 66 Hz
		1024 x 768 @ 60 Hz, 75 Hz, 85 Hz	
		800 x 600 @ 60 Hz, 85 Hz	
		640 x 480 @ 60 Hz, 75 Hz, 85 Hz	
	Text Mode	720 x 400 @ 70 Hz	

Technical Specifications - Monitors

	Mac Mode	1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz
	Sun Mode	1152 x 900 @ 66 Hz
	Maximum Pixel Clock Speed	202 MHz (VGA input); 162 MHz (DVI input)
	User Programmable Modes	Yes, 10
	Anti-Glare	Yes
	Anti-Static	Yes
	Default Color Temperature	6500 K
Video Input	Plug and Play	Yes
	Input Signal	Four connectors, including one 15-pin mini D-sub VGA, one DVI-I (VGA analog and digital input), one composite video, and one s-video
	Input Impedance	75 ohms \pm 10%
	Sync Input	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green
	Video Cable	VGA to VGA; VGA to DVI-I; DVI-D to DVI-I
	Video Cable Length	5.9 ft (1.8 m)
Power	Input Power	Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz
	Frequency	47.5 to 63 Hz
	Maximum	< 75 W
	Power Saving	< 5 W
	Power Cable Length	5.9 ft (1.8 m)
Mechanical	Dimensions (H x W x D)	<p>Unpacked with stand 17.36 to 20.9 x 17.8 x 8.27 in (44.1 to 53.1 x 45.2 x 21.0 cm)</p> <p>Unpacked without stand (head only) 14.29 x 17.8 x 3.19 in (36.3 x 45.2 x 8.1 cm)</p> <p>Packaged 11.5 x 21.9 x 23.9 in (29.2 x 55.6 x 60.6 cm)</p>
	Weight	<p>Unpacked With stand: 20.28 lb (9.2 kg); Without stand: 12.35 lb (5.6 kg)</p> <p>Packaged 26.9 lb (12.2 kg)</p>
	Tilt Range	-5° to + 25° vertical
	Swivel Range	-35° to + 35°
	Height Adjustable	Yes, range 3.54 in (9.0 cm)
	Pivot Rotation	Yes
	Base	Attached
Environmental	Temperature – Operating	46° to 95° F (10° to 35° C)
	Temperature – Non-operating	6° to 140° F (-10° to 60° C)
	Humidity – Operating	20% to 80% non-condensing
	Humidity – Non-operating	5% to 85%
	Altitude – Operating	+12,000 ft
	Altitude – Non-operating	+40,000 ft

Technical Specifications - Monitors

Options	HP Desktop Access Center	Sold separately, the HP Desktop Access Center features integrated microphone/headset jacks, dual function headset for phone/PC support, a MultiBay slot for adding an optical drive (sold separately), and four USB ports for easy integration of third-party digital solutions; part number DK985A. For more information, refer to the HP Desktop Access Center QuickSpecs.
Other	Accessories Included	VGA to VGA cable – connects the graphic card's VGA analog connector to the monitor's input #1 (VGA analog) connector VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector DVI-D to DVI-I cable – connects the graphic card's DVI-D digital connector to the monitor's input #2 (DVI-I digital) connector
	User Guide Languages	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish
	Warranty Languages	English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese
	Color	Carbonite/Silver
	VESA External Mounting	Yes (Standard 4 hole pattern, 100 mm)
	Kensington Lock-Ready	Yes
Certification and Compliance		Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, *Energy Star Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Windows Certification (Microsoft® Windows® 98, Microsoft Windows 2000, and Microsoft Windows XP) * Energy Star Compliant available summer 2004.
Service and Warranty		Limited three years parts, labor, and on-site service, including backlight. Availability varies by region. Certain restrictions and exclusions apply. Consult HP Customer Service for details.

Technical Specifications - Monitors

HP Flat Panel Monitor L2335	Panel	<p>Type 23-inch Active Matrix TFT (thin film transistor)</p> <p>Viewable Image Area (diagonal) 23 in (58.4 cm)</p> <p>Screen Opening (W x H) 19.53 x 12.24 in (49.6 x 31.1 cm)</p> <p>Viewing Angle (typical)* Up to 170° H/170° V (10:1 minimum contrast ratio)</p> <p>Brightness (typical)* Up to 250 nits (cd/m²)</p> <p>Contrast Ratio (typical)* Up to 500:1</p> <p>Response Rate (typical)* 16 ms (typical, rise + fall)</p> <p>Pixel Pitch 0.258 mm</p> <p>Color Depth Support 16.7 million colors</p> <p><i>* All specifications are provided by the component manufacturers. Performance specifications represent the highest specification of all HP's component manufacturers' typical level specifications for performance. Actual performance may vary either higher or lower.</i></p>
	On Screen Display (OSD) Controls	<p>Buttons or Switches PiP (Picture in Picture), Input Select, Auto Adjust, OSD Up, OSD Down, OSD Menu Select, Power</p> <p>Languages English, French, German, Spanish, Italian</p> <p>User Controls Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, video picture-in-picture (size and position), input selection (includes separate direct access key for dedicated swap between inputs 1 and 2), factory reset</p>
	Signal Interface/ Performance	<p>Horizontal Frequency 30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz)</p> <p>Vertical Frequency 48 to 85 Hz (VGA and DVI input)</p> <p>Graphics Controller Pixelworks PW172</p> <p>Native Resolution 1920 x 1200 @ 60 Hz (recommended)</p> <p>Preset VESA Graphic Modes (non-interlaced)</p> <p>1920 x 1200 @ 60Hz</p> <p>1600 x 1200 @ 60 Hz, 75 Hz</p> <p>1280 x 1024 @ 60 Hz, 75Hz, 85 Hz</p> <p>1280 x 960 @ 60 Hz</p> <p>1152 x 900 @ 66 Hz</p> <p>1024 x 768 @ 60 Hz, 75 Hz, 85 Hz</p> <p>800 x 600 @ 60 Hz, 75Hz</p> <p>640 x 480 @ 60 Hz, 75 Hz</p> <p>Text Mode 720 x 400 @ 70 Hz</p> <p>Mac Mode 1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz</p> <p>Sun Mode 1152 x 900 @ 66 Hz</p> <p>Maximum Pixel Clock Speed 202 MHz (VGA input); 162 MHz (DVI input)</p> <p>User Programmable Modes Yes, 10</p> <p>Anti-Glare Yes</p> <p>Anti-Static Yes</p> <p>Default Color Temperature 6500 K</p>

Technical Specifications - Monitors

Video Input	Plug and Play	Yes	
	Input Signal	Five connectors, including one 15-pin mini D-sub VGA, one DVI-I (VGA analog and digital input), one composite video, one s-video, component video	
	Input Impedance	75 ohms \pm 10%	
	Sync Input	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green	
	Video Cable	VGA to VGA; VGA to DVI-I; DVI-D to DVI-I	
Power	Video Cable Length	5.9 ft (1.8 m)	
	Input Power	Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz	
	Frequency	47.5 to 63 Hz	
	Maximum	< 100 W	
	Power Saving	< 5 W	
Mechanical	Power Cable Length	5.9 ft (1.8 m)	
	Dimensions (H x W x D)	Unpacked	17.36 (min) to 20.9 (max) x 21.46 x 8.27 in (44.1 (min) to 53.1 (max) x 54.5 x 21.0 cm)
		Unpacked without stand (head only)	14.57 x 21.46 x 3.35 in (37.0 x 54.5 x 8.5 cm)
		Packaged	11.5 x 25.75 x 23.86 in (29.2 x 65.4 x 60.6 cm)
	Weight	Unpacked	22.27 lb (10.1 kg)
		Packaged	30.87 lb (14.0 kg)
	Tilt Range	-5° to + 25° vertical	
	Swivel Range	-35° to + 35°	
	Height Adjustable	Yes, range 3.54 in (9.0 cm)	
	Pivot Rotation	Yes	
Environmental	Base	Attached	
	Temperature – Operating	46° to 95° F (10° to 35° C)	
	Temperature – Non-operating	6° to 140° F (-10° to 60° C)	
	Humidity – Operating	20% to 80% non-condensing	
	Humidity – Non-operating	5% to 85%	
	Altitude – Operating	+12,000 ft	
	Altitude – Non-operating	+40,000 ft	
	Options	HP Desktop Access Center	Sold separately, the HP Desktop Access Center Features integrated microphone/headset jacks, dual function headset for phone/PC support, a MultiBay slot for adding an optical drive (sold separately), and four USB ports for easy integration of third-party digital solutions; part number DK985A. For more information, refer to the HP Desktop Access Center QuickSpecs.

Technical Specifications - Monitors

Other	Accessories Included	<p>VGA to VGA cable – connects the graphic card's VGA analog connector to the monitor's input #1 (VGA analog) connector</p> <p>VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector</p> <p>DVI-D to DVI-I cable – connects the graphic card's DVI-D digital connector to the monitor's input #2 (DVI-I digital) connector</p>
	User Guide Languages	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish
	Warranty Languages	English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese
	Color	Carbonite/silver
	VESA External Mounting	Yes (Standard 4 hole pattern, 100 mm)
	Kensington Lock-Ready	Yes
Certification and Compliance		<p>Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, *Energy Star Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Windows Certification (Microsoft® Windows® 98, Microsoft Windows 2000, and Microsoft Windows XP).</p> <p>* Energy Star Compliant available summer 2004.</p>
Service and Warranty		Limited three years parts, labor, and on-site service, including backlight. Availability varies by region. Certain restrictions and exclusions apply. Consult HP Customer Service for details.

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